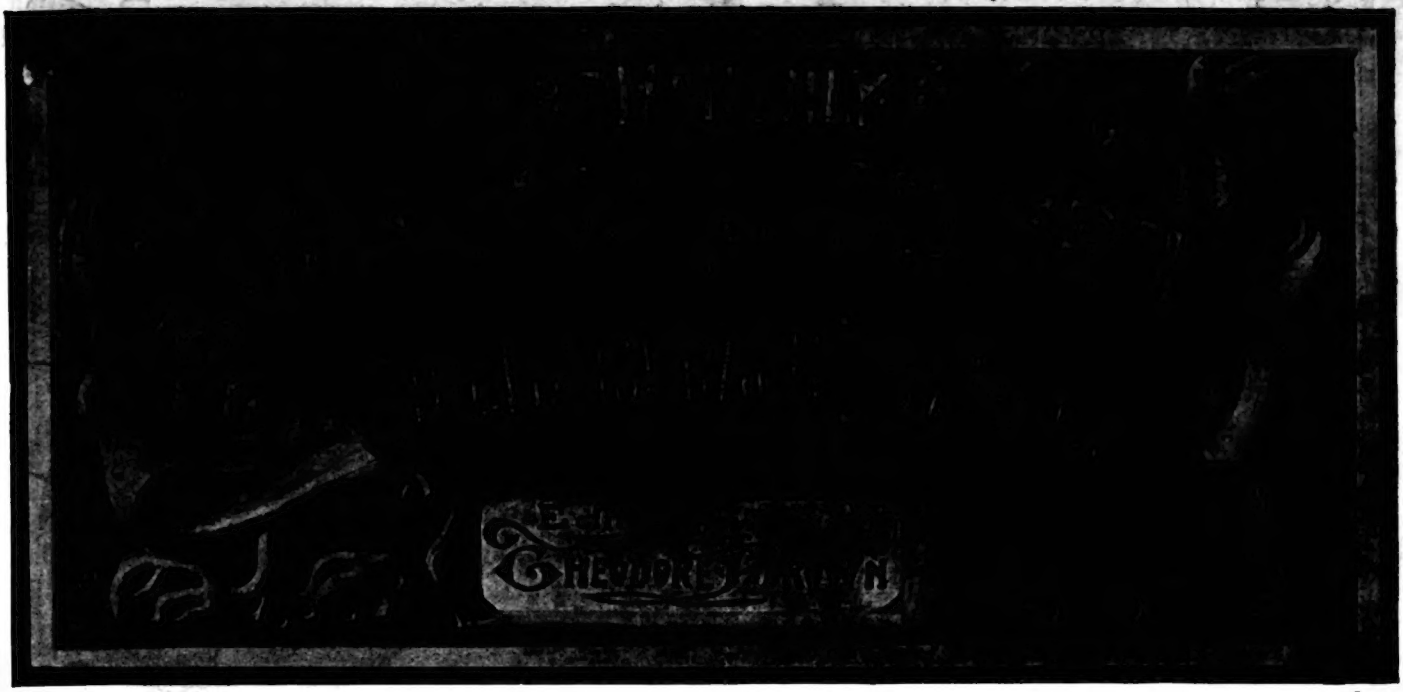

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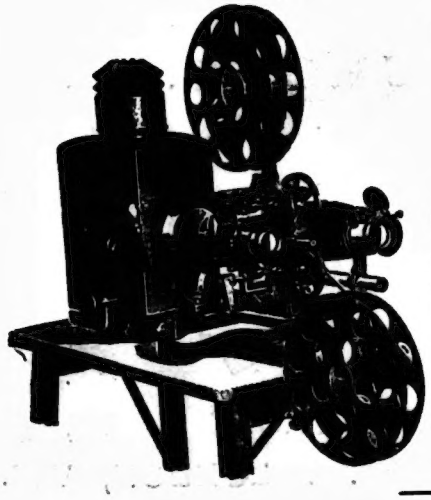

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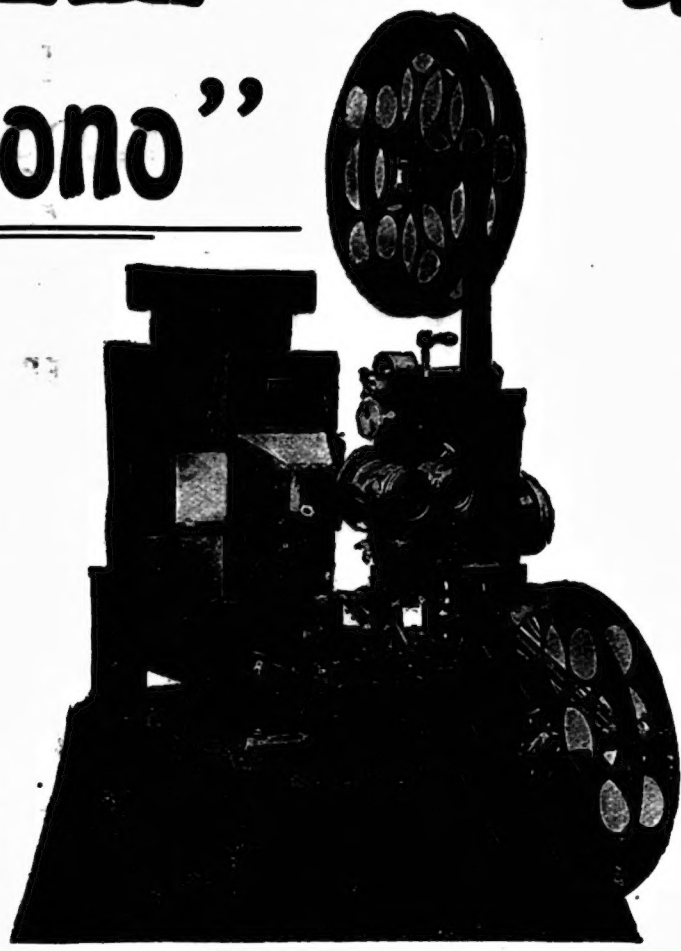

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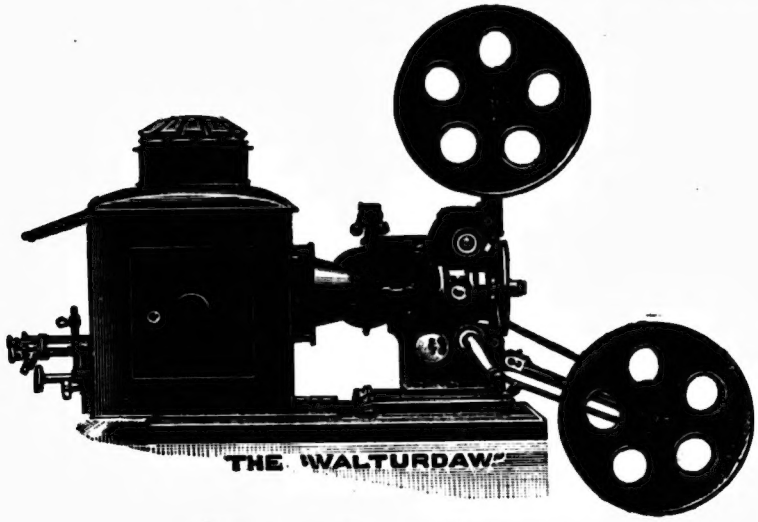

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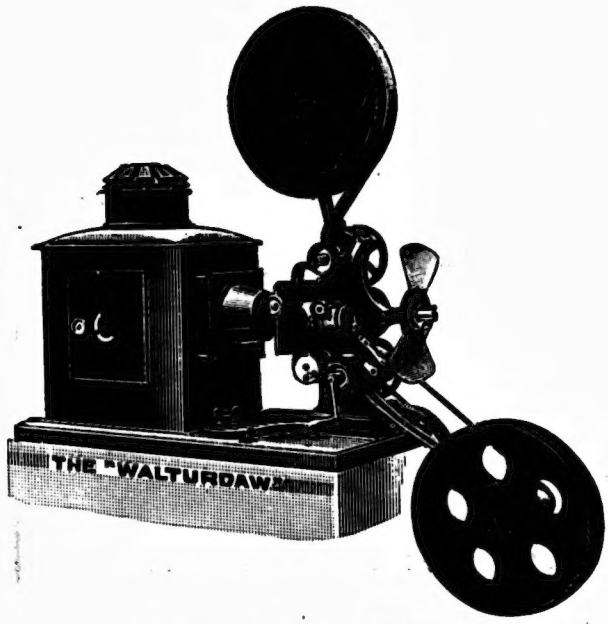

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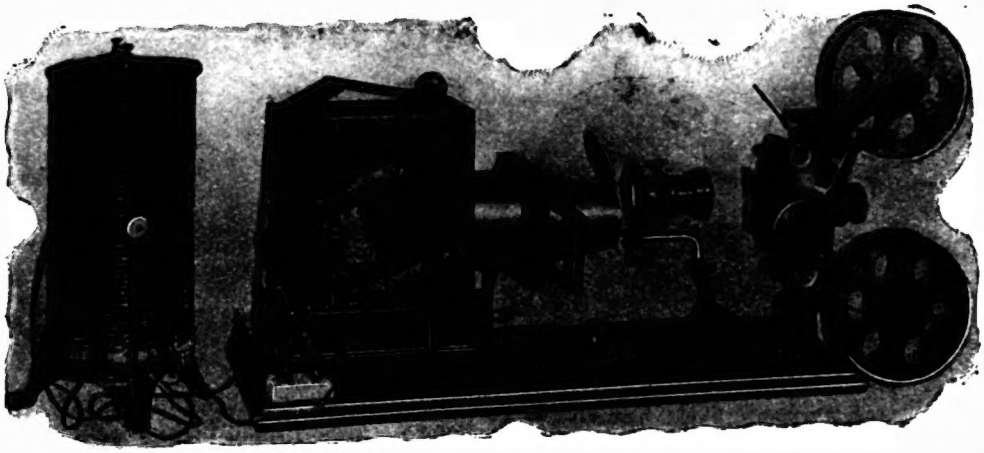

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I HAVE recently had a run through Belgium, and have been much interested in comparing the position of the moving picture industry there with its state in Great Britain. I found nearly every café with any pretension to a musical entertainment had its cinematograph show, given three or four times during the evening, and interspersed with the musical programme. The screen used averaged from 12 to 20 feet square, and was in a position to be seen by those seated at the crowded small tables throughout the establishments. In some cases the screen was made to unroll from the ceiling in the centre of the building, so that people seated both ends could watch the pictures, it being pulled up out of sight after each show. I found that iron screen boxes were not used, but that the lantern was generally hidden from public gaze by a four-fold screen of cloth. I naturally tried to obtain admission at several of them, and was politely shown the lanterns and accessories. I found they were good modern instruments, and that the French make predominated. The operator had excellent knowledge of his subject, and each establishment tried to outvie the other in having the most up-to-date series of films, which were duly advertised at the fronts of the building. The programmes were continually changed, and the pictures received many signs of approbation from those present. I could not help wondering whether these exhibitions will be continued during the hot days, when the people take their refreshments on the boulevards instead of inside the building, or whether out-door performances will be given.

WE in England are not blessed with café chantants, but in London the higher class restaurants now give selections of vocal and instrumental music during lunches and dinners. As they took the Continental cities for a guide in this, there is a possibility of them adding the cinematograph, and we may soon be able to obtain a five or seven course dinner to the accompaniment of moving pictures. We, however, must not find fault with our present optical lantern shows in London, for not only are the music halls giving moving pictures as an important "turn," but are improving the occasion by having special music written, and in some cases short descriptions of the scenes spoken from the stage. We can do nothing but commend three entertainments we have recently visited, namely, Burton Holmes' Travelogues, West's pictures at Earl's Court, and the series of pictures of the Russo-Japanese War, which Urbanora have given.

AT the Alhambra, which is almost synonymous with Urbanora, we recognised many old favourites among the films which have not improved by age and wear, for many were cracked and far from clear. They were the first part of the series, and depicted the Russian Army in Manchuria. The second part was the Siege of Port Arthur, and the third the Surrender of Port Arthur. Most interesting and realistic are these pictures, and anyone who has followed the ordinary war correspondents' accounts of the fighting would have the truths brought home

in a most effective manner by the views. Mr. Charles Urban deserves every praise for his enterprise, and Messrs. George Rogers and Joseph Rosenthal have evidently been the right men to secure the photographs.

IT is the second year in England of Mr. Burton Holmes' Travelogues, and we trust his splendid entertainment will now be a regular visitor to our shores. It is a varied programme, illustrated with magnificently coloured views and films. The fact that struck us most was the clearness of his slides and the steadiness of his films. Nothing harsh or unnatural is to be found in the slides, the tones being blended with delicate and artistic touch, which make them a head and shoulders above the average slide. In his description of the scenes there is nothing pretentious; no hard and dry-as-dust lecture, but a calm and interesting statement of facts which appeal to the audience, and give them a ready grasp of the subject and a large interest in the views portrayed. We have time after time advocated moving picture lectures, and if Mr. Holmes' Travelogues are taken as a pattern, the revival of the optical lantern would quickly be at hand.

AGAIN, at Earl's Court, where West's entertainment is being well received by hundreds of visitors to this splendid Exhibition, novelty and interest are brought to bear at the living picture descriptions of "Our Navy" by the cries, music, and effects which the orchestra use. We have heard it said that the figures in moving pictures are so lifelike that we can almost hear them speak, but West's score tremendously in their attempt to go still further; for we hear the feet patter on the decks, whilst the figure is dancing a hornpipe on the screen to the accompaniment of a violin, apparently played by a sailor; the splash of diving; the cries for help; the tread of marching soldiers; the rattle and boom of cannon and the hundred and one scenes which make the pictures highly realistic and twice as interesting. We should like to see more of this kind of enterprise thrown into the shows given at our halls.

IT is true the so-called "Lantern Season" is over, and yet a glance at the papers will show how much the projecting instrument is still in use during these summer months, indeed, it is difficult to find a time of the year when the lantern is not an indispensable adjunct to commercial and educational enterprise. Doubtless, a practical way of making the importance of the lantern felt by the community at large, would be to sweep out of existence every instrument for a period of one month. The theatres and halls would then be without their eagerly looked for "Living Picture turns"; the learned societies would be divested of the only means of demonstrating the various advances and progress made by their researches and organisations, whilst the commercial man would lose the income derived from the manufacturing of apparatus, slides, etc.

ALL these are acknowledged in the "Lantern Season," but, after the above reflections, when may we say the lantern is "Out of Season?" The fact is there is not one day in the whole year in which it can be dispensed with. If this be the case, it follows that, with the using of the lantern and its accessories during the summer, there are also unceasing interests to be looked after which are best served through a journalistic medium. Hence, to those of our readers who have thoughtlessly, perhaps, assumed surprise on learning that THE OPTICAL LANTERN AND CINEMATOGRAPH JOURNAL is going strong in these *lighter days*, we suggest that if they think a moment or two on what we have said, we are confident that their verdict will be with us.

WHEN we say we are *going strong*, we wish to infer that we are *growing*, not, perhaps, with the rapidity of Mrs. Scott's plants upon the cinematograph screen; nor with the suddenness of mushroom contemporaries, which have come and gone within our own experience; but with a growth of natural development, based on a certain and an ever-increasing support, not only in Great Britain, but from all parts of the world. We do not wish

BRITISH MUSEUM

to be misunderstood, however; the support we have had in the past, and are still receiving, will not satisfy the requirement of the larger field of action we anticipate for the future. We earnestly solicit active assistance from every reader, and ask that each will introduce us to as many friends as possible. There is no other publication in this country that appeals to the Lantern world in general, and seeks exclusively to keep readers in constant touch with up-to-date information respecting what has been done, what is being done, and what is likely to be done, in Lantern and Cinematograph work.

Our offer to send a free specimen copy to friends of our readers is still open; and on receipt of request, with names and addresses of those likely to become interested, we shall be happy to post on copies immediately. Suggestions for the improvement of our Journal will also receive the most careful consideration.

At the time of writing this, the Optical Convention at the Northampton Institute is in full swing. It was opened on Tuesday evening, May 29th, under the presidency of Dr. R. T. Glazebrook. The aims of the Convention are to increase the interest taken in Optical Science; and the very excellent display of instruments and apparatus to be seen in the large hall, together with the helpful papers that are being read by experts on their particular subjects, should accomplish the object of the Convention. On another page we are giving a full report of the paper read by Mr. C. S. Crawley on "Stereoscopic Vision."

We regret to see that only a few of the cinematograph firms are exhibiting apparatus, nevertheless, this section of the Exhibition is of especial interest. Artificial lights and optical devices for projection are shown. The Nernst Lamp is to the front in the exhibits of Messrs. John J. Griffin & Sons, Ltd., and Mr. R. W. Paul, the latter firm showing some extremely compact lanterns especially designed for use in conjunction with the so-called Nernst-Paul Lamps. Arc lamps, their leading features briefly summarised in the catalogue of the Exhibition, are shown by Mr. Paul, by Messrs. Ross, Ltd., by Messrs. A. & J. Smith, and by Messrs. John Wrench & Son. Messrs. Newton & Co. have a striking exhibit of projecting lanterns, and optical lanterns of various forms are shown by several other firms. Cinematographs are represented by manufacturers of only three firms, namely, Mr. R. W. Paul, the Prestwich Manufacturing Co., and Messrs. J. Wrench and Son.

Catalogues and Books Received.

Stanley & Co.'s Monthly List.—This firm send their list of lenses and apparatus for June. In addition to the camera lenses for which the firm is particularly noted, we find they are putting on the market a cheap Stereoscopic Hand Camera, of the well known "Verascope" type, a small stereoscope of special construction for viewing the pictures is also supplied.

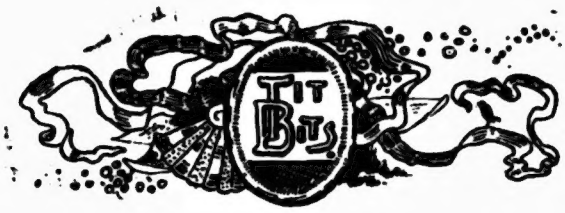
Price List of Nernst Lamps reaches us from Messrs. John J. Griffin & Sons, 20-26, Sardinia Street, Lincoln's Inn Fields. The lamps are supplied in various patterns, some of which are supplied with special heating circuit, the purpose of which is to enable the light to be turned up at any moment, and without having to wait for some seconds whilst the filaments become fully illuminant, as in the old patterns.

Messrs. Crick & Sharp sends us their supplementary list of new films, containing "Attempted Wobbling of the Derby Favourite," being a tale of love and villainy, in five scenes; and "The Royal May-Day Festival."

Living Photographs at Home.—Messrs. Chas. Zimmermann & Co., of 9 and 10, St. Mary-at-Hill, London, send a list giving particulars of the Ernemann "Kino" Cinematograph Camera. By means of this instrument, it is claimed that it is possible and easy for the amateur to enjoy the fascinating work of taking living pictures of his own relatives, and scenes of home life. The apparatus comprises the mechanism for taking the negative, printing the positive, enlarging and projecting the pictures.

"Fallowfield's Courier."—The current issue is devoted almost exclusively to the "Taquta" Camera, which, we understand, is having a very heavy sale.

The American Stereoscopic Co., who have opened premises at 5, Macclesfield Street, Shaftesbury Avenue, W., send a catalogue of their stereoscopic views, amongst which we notice a good selection of subjects pertaining to the Russo-Japanese War.



Protection was afforded Mr. Urban's representative, who took the successful war pictures, by a bullet proof shield for his camera. This enabled him to get as near the fighting line as possible, and proved very serviceable and necessary.

Electric Cinematograph. — The name of Scott as an entertainer is well known in North Northumberland. In the days of the magic lantern Mr. Scott visited even the smallest villages. But Mr. Scott has now to betake himself to larger centres and has earned the title of the "Cinematograph King," and runs his entertainment under the title of Scott's Royal Cinematograph Company with much success.

The Autoscope Company, in the course of a few days, will exhibit at the Palace Theatre some interesting views, illustrating every process in the manufacture of salt. The pumps are seen at work raising the pure natural brine from 200 feet below the earth's surface, and men and women—in quaint working attire—illustrate their work in the various processes through which table salt passes before it reaches the consumer.

Living Pictures Still Popular.—Mr. Waller Jeffs is completing a fortnight's visit to Exeter, where he has had excellent houses at Victoria Hall. The New Century pictures have become very popular at Birmingham, where Mr. Jeffs has fixed his headquarters. No less than five hundred consecutive exhibitions have been given at Curzon Hall, in that city. One very excellent feature in the programme is the series of coloured pictures and Miss Kathleen MacCabe's charming singing.

The Warsaw Massacre.—Mr. Harry De Windt, who has just returned from an extended tour in the Balkan States and Southern Russia, will shortly lecture in London. He and an artist of the Urban Bioscope Company were at Warsaw at the beginning of the revolt, and his living pictures of life in "Savage Europe" will include scenes from the sad May Day massacre. Pictures of the daily life of King Peter of Servia will also be shown, and some of the views will be accompanied by national music produced by the phonograph and folk songs.

Wireless Telegraphy at the Empire Theatre, Edinburgh.—Captain Bloom has been giving interesting demonstrations of wireless telegraphy at the Empire, Edinburgh, and, according to the *Scotsman*, the only feeling of dissatisfaction was that the receiving station—the most distant stall from the stage—was so near. The introduction of the element of distance would have lent additional attractiveness, but the display was so interesting that one would fain have seen more of it. To the eye, the sending and receiving apparatus seemed simple, and presented the appearance of a couple of large portable telephones on tripod stands.

Photographs of Winchester Cathedral.—Any amateur photographer who may visit Hampshire during the next month or so will have an opportunity of securing what may prove to be unique mementoes, and at the same time rendering valuable service to archæological study, by securing photographs of the eastern portions of Winchester Cathedral, the stability of which seems to be seriously threatened by subterranean watercourses, causing a subsidence of the foundations, which is engaging the attention of the Dean and Chapter, and causing considerable anxiety and alarm to architectural experts as well as to the Cathedral authorities. The Cathedral, the longest in Europe with the exception of St. Peter's, in Rome, and in many respects one of the finest and most memorable examples of early architecture in this country, appears to be partly founded on piles driven into a bed of gravel, through which some of the subterranean waters which feed the river Itchen find their way; and the part of the fabric most seriously threatened is probably the most ancient portion of the Cathedral buildings, including the Saxon arches of the crypt beneath the choir and the extreme south-eastern corner of the edifice, which are said to date from the time of King Alfred, marking, as they do, the scene of that great monarch's early education; a relic of the past history of our nation which we can ill-afford to lose.

Conversazione of the Royal Society.—Among the scientific novelties exhibited to the distinguished company at the conversazione of the Royal Society, on the 17th May, were some objects of special interest to the lanternist, not the least attractive of them being a series of remarkably fine photographs taken during the recent expedition to Thibet, the "Forbidden Land," which were shown by Mr. Percival Landon. Another series included a a selection from the photographic views taken during the National Expedition to the Antarctic regions, which were exhibited by Dr. Ect Wilson. Sir William Crookes showed specimens of the effects produced by the action of light upon glass, as compared with those due to radium. Six pieces of glass which had been exposed to light for about fifty years showed changes, which Sir William Crookes was able to repeat within ten days, by the exposure of similar glass to the action of a minute quantity of radium bromide enclosed in a quartz tube. The purple colour produced in window glass containing manganese by long exposure to sunlight will be familiar to most persons; and glass of this description which had been exposed to light for forty years had its colour distinctly intensified by the action of radium salt within three days. In the domain of astronomical illustration, an extremely striking exhibit by Mr. W. Shackleton should prove of special interest, in prospect of the great solar eclipse of August 30th, in the present year. This was a mechanical lantern slide showing in succession all the phases of an eclipse, from the first apparent contact with the lunar disc to its final disappearance, including the chromosphere and corona; while the very brief and transient view of these phenomena which the actual eclipse can afford, being limited to the duration of the total phase, may be extended at will, so as to admit of leisurely inspection of these faintly illuminated objects, which are only brought into view during the few minutes or seconds when the brilliancy of the solar disc is obscured by the dark body of our satellite.

STEREOSCOPIC VISION.

Paper read at the Optical Convention. Friday, June 2nd.

By C. W. S. Crawley.

THE human eyes, faulty as they may be in many ways, are in one respect an instrument of extreme precision. As a means of instantly detecting minute differences of angle, they have a delicacy which is but seldom appreciated. Helmholtz has investigated the matter, and in his *Physiological Optics* describes experiments which show that the eyes are capable of detecting a difference between two angles of as little as one minute. This power of discrimination it is that enables us to judge distance by stereoscopic vision, not, indeed, to judge distance absolutely, but to say which of two objects is the nearer.

To take a concrete example. Let us place two rods or other suitable objects, the one at the distance of 2 metres, and the other 2 centimetres further. Let them be nearly in the same line of sight, be perfectly evenly lighted, and have all surroundings cut off, so that there is no means of judging which is the further except the opinion that we form by looking at them. If we do so with one eye only, we could not say which was the nearer, nor could we even if they were much further apart.

With two eyes, however, no one with ordinary vision would have any doubt. One rod "looks" nearer than the other, though why it does we do not and cannot consciously realise. This power of judging distance is common to all; it has always been advantageous to every member of the human race to judge distance, and to do so continually the whole time that he is awake. Evolution has consequently had its fullest opportunities, and has seized them with marvellous results. How are we able to judge that one of these rods is nearer than the other? Surely by the fact that, when we look at it, we have to converge our eyes a little more than when we look at the other.

The proximate physical fact that we unconsciously judge by is an appreciation of the comparative muscular efforts to produce the convergence of the eyes on objects at different distances. Taking the eye-distance as 65 mm., which is about the normal, the angle eye—rod—eye at 2 m. is roughly 1° 57′, while at 2 m. 20 cm. it is roughly 1° 56′. The difference of convergence of the eyes on the two rods is consequently only about 1 minute, and probably 98 per cent. of the population would have no hesitation about which is the nearer, and the remaining 2 per cent. would be found not to have stereoscopic vision at all. But with all reverence for a great name, Helmholtz put the limit far too high. From numerous tests in all sorts of conditions and ages of men and some women, as will be seen in Table I., we find that only in two cases was the angle even half a minute. The general angle appears to be about 10″, and really good men can appreciate with certainty a difference of 2 to 3 seconds.

In repeating the experiments there are one or two points that must be attended to, to ensure that the distance is judged only by stereoscopic faculty. The lighting must be even and regular, and should be exactly behind the observer, otherwise sbadows may be of great help, and far too good results unintentionally obtained. The background should be fairly uniform and preferably, at least, as far off again as the rods. Ordinary wax matches make excellent rods. The holders, slides, and all surroundings must be cut off by a screen. The eyes should be on a level with the tops of the matches.

A great deal of most excellent work has been done on stereoscopic vision by Dr. Pulfrich, of Jena, and will be found in his various papers. Among other uses he has applied it to surveying work, two photographs of the same landscapes being taken, at a considerable distance apart, to increase the stereoscopic effect. (The Astronomer-Royal at the Cape has also worked on this line.) The Zeiss Stereoscopic Range-Finder also is principally due to him.

One of the most beautiful uses made of Stereoscopic Vision is in astronomical work, and is described in a paper by Dr. Pulfrich, read before the Astronomical Convention at Göttingen in 1902.

Photographs of the same region of the sky are taken at a suitable interval, which may be years apart, and viewed stereoscopically. Any stars that have moved during the interval parallel to the line joining the eyes stand out in front of the plane of the others, or retire behind that plane, and are spotted instantly and with certainty. This is the very finest stereoscopic effect that we can ever hope to get. Suppose we take two photos at a year's interval in a direction at right angles to the line of the sun's motion in space, that motion being about 35,000,000 miles per year, when we put the two in a stereoscope we get the effect of a stereoscopic base of about 70,000,000 miles, and as photos are now taken continually, we shall steadily enlarge that base year by year, and century by century.

Dr. M'Kenzie Davidson has used stereoscopic vision for X-ray work. An X-ray photo of a leg, for example, is taken; the tube shifted a few centimetres to one side, and another photo taken. When the two photos are viewed in a stereoscope, instead of having a mere flat diagram, all the bones stand out in perspective, and any foreign bodies such as bullets, needles, etc., can be exactly localised. He has gone further. Two tubes, a little distance apart, are worked alternately. A vibrating shutter in front of the right eye is open when the left tube is one and *vice versa*. A perfect stereoscopic effect is thus obtained. Incidentally the two photos need not be equal; one may be so bad as to give an extremely weak picture, and yet the stereoscopic effect will be perfect. In the same way a man may have one eye very defective indeed, and yet have good stereoscopic vision.

It was mentioned above that an exceptionally good man will appreciate as little as 2 to 3 secs. Of course, when working with rods as described, there is a feeling that the readings may have been assisted by shadows, or in some way unconsciously "cooked." The figure is, however, confirmed by tests with the Forbes' Range-Finder. Now in this case no such chance of error can arise, as there is no question of judging by anything but stereoscopic vision, pure and simple.

The instrument is fairly well known, but a few words of description may be given. The object is viewed through a prismatic binocular. In the focal plane of the object-glasses of the two sides are two absolutely similar photographs of a balloon on clear glass. The two appear as one by stereoscopic vision. If they are both at the centre of the field they appear at the same distance as an object at practically infinite distance, say, the moon. One of them can be brought towards the other by a micrometer screw, and the eyes must converge a little to still see them as one object. The balloon then appears at the same distance as an object on the landscape, on which the eyes have to converge at the same angle. By moving the screw the balloon can be made to appear to approach or recede till it appears the same distance as any particular object; the range of the latter is then shown on the perfectly divided screw-head. With the ordiary binocular of eight magnifying power, and about 3 in. eye-distance, the range that can be taken to one or two per cent. is limited to about 120 yds., but by adding an arrangement of prisms on a base 6 ft. long, the same effect is produced as if the eyes were 6 ft. apart, and distances twenty-four times greater—say 3,000 yds.—can be taken.

The pointer on the scale can be set autonomously, if one may be allowed the expression, *i.e.*, without reference to any known distance. A reading is taken of any object at suitable but unknown distance, first with the binoculars alone, then with the based added. From these two readings an accurate setting of the pointer can be made.

Very numerous trials have been made with this instrument, both in the Army and Navy and with civilians. The sailor might have been expected to have come out far better than the soldier, owing to his having to exercise his sight more, but there is no noticed difference. The common private in the Army can almost always after half-an-hour's instruction—often, indeed, after only five minutes—take a range of about 2,000 yds. accurate to 20 yds. This with a 6 ft. base and eight magnification power is equivalent to 17 ins., and in a very few hours he will be taking 3,000 yds. accurate to about 30 yds.

As might be expected, some men are better than others. One or two skilled Army sergeants give very good results; but this may in some cases be due to other marked causes—general smartness—rather than really better stereoscopic power. But there is one observer we have come across who has distinctly greater stereoscopic power than the average. The first time he saw the instrument was at Bisley. He then looked through it at a target distant some 1,140 yds., and ranged it within 2 yds. first shot. There are two of his readings that may be mentioned. A tower of Holloway College, at Egham, was

just visible among the trees on the sky line. It was a nasty object, that is, its surroundings made the stereoscopic effect difficult to get. Five readings of this were taken, and the middle one of them—which has always been found far more reliable than the mean—gave the distance 10,740 yds., as measured in the Ordnance Map, correct to 100 yds. in 10,000. This gives 7 ins. on a bad object at very long range indeed. Another case was at Gibraltar —same observer. His readings on the corner of a castle were 2147, 2149, 2149, 2147, 2147, 2145.

Here, then, we have five successive readings, the maximum difference being 4 yds., which, with eight magnifying power at 2,000 yds., means an angle of 2·8 secs. as *maximum* error. His note on this says :—" The scale of instrument at this range does not permit of accurate reading to less than 5 yds., but knowing that the greatest possible precision was wanted, I estimated the values of very slight differences in a set of almost identical readings. I might have entered them all as identical except the last." When he had finished he was told by the R.E. Captain, before whom he was working, that the distance was 2,451 yds. He thereupon checked his Range-Finder autonomously, found it perfect, and asked to have the R.E. measurements checked, as they were certainly wrong. They were re-checked, and the actual distance was found to be 2,145·7 yds.

Light, atmosphere, and object were no doubt perfect; but that merely means that there were no opposing elements, nor that there was any assistance from any other source. The distance was measured repeatedly and accurately by the stereoscopic power, and that alone; that reduces Helmholtz's 1 minute to about 3 seconds.

TABLE I.

Tests at 7 ft. and 23 ft. 6 in. by two observers. Wax matches with red heads level with each other and with the eye. One match can be pulled towards or away on a slide, but nothing but the matches are visible. + means the movable match was set too far and *vice versa*; "0" means less than ½ mm.

Distance 7 ft. 1 mm. = 2·3 secs.		Distance 23 ft. 6 in. 1 mm. = ·28"	
F.	C.	F.	C.
− 5"	− 10"	− 3·36	+ 3·36
0	+ 2·5	− 1·20	− ·28
− 2·5	+ 2·5	+ 2·24	+ 6·72
+ ·25	+ 1.25	+ ·84	+ ·28
− 5·	+ 3·75	0·	+ 3·36
+ ·5	+ 10	+ ·56	+ 3·92
+ 5·	0	− 1·20	+ 16·80
+ 2·5	0	− ·84	+ 7·84
0.	+ 7·5	+ 2·80	
− 5·	0	+ 3·92	
Mean 2·6"	3·7"	Mean 1·7"	4·2"
Al. Mn. − ·9"	+ 2·7"	Al. Mn. − ·37"	4·2"

TABLE II.

TEST ON VARIOUS PEOPLE AT 7 FT.

		Age.	Mean.	Max.	
1	D. H.	36	2·3"	3·6"	Engr. Well-known tennis player
2	E. C.	30	2·7	5·4	Solicitor. Good billiard player
3	B.	...	4·5	9	Engineer. Good billiard player
4	A. T.	46	5.1	9	Skilled Observer
5	T. B.	9	5.2	9	Board-school boy
6	M.	25	5·8	9	Physical Laboratory assistant
7	M. H.	35	5·8	9	Lady. Very good tennis player
8	J. R.	47	7·2	14	Physical laboratory assistant
9	E.	46	9	11	Lady. Good tennis player
10	C.	45	9·1	13	Skilled observer, after good practice with R.E.
11	S.H.	10	10	22	Board-school boy
12	R. R.	45	11	36	Engineer
13	Mi.	20	11	18	Physical laboratory assistant
14	H. O.	5	11	45	Board-school boy
15	g	9	11·6	27	Board-school girl
16	O. Ch.	70	15	22	Engineer. Skilled observer
17	T. R.	6	15·8	31	Board-school boy
18	Res.	50	19	31	Chemist
19	C. P.	4	22	36	Board-school boy
20	Hadl.	35	40	68	Engineer

Correspondence.

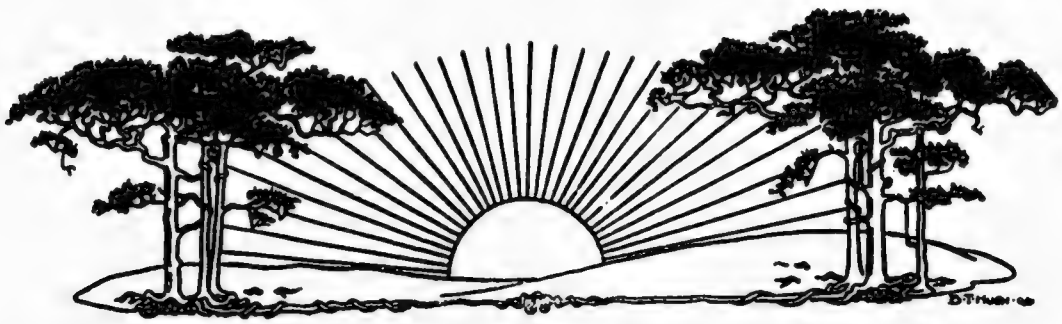
ADVERTISEMENTS ON THE CLOUDS.

Sir,—Some time ago a firm in London projected words or advertisements with a lantern or searchlight on the clouds or atmosphere. Could you give me any information about it, or the name of the firm that supplied the apparatus.—Yours, etc., J. W. HAYWARD, 122, Yorkshire Road, Rochdale.

[Our correspondent doubtless refers to apparatus invented by Mr. Eric Bruce, called the ærial graphoscope. We do not know this gentleman's address, perhaps one of our readers can supply it.—ED.]

Sir,—Please forward me the Lantern Journal from Dec. issue, for which find enclosed 5s. I have an English book, "Living Pictures," by H V. Hopwood, dated 1899. Would you kindly inform me if any later books have been issued on the subject and where obtainable.—Yours, etc., HERBERT FINLAY, Blyth St., Brunswick, Victoria, Australia.

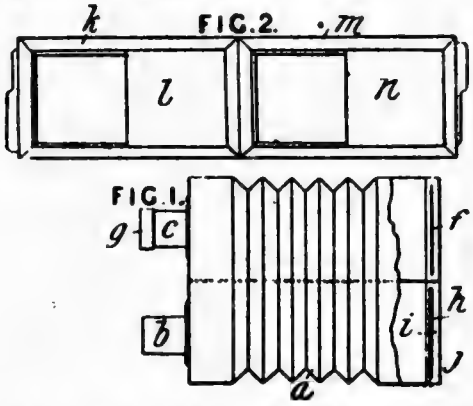
[Animated Photography, the A B C of, by Cecil M. Hopworth. No. 14 of the "Amateur Photographer," 1s., of Messrs. Hazell, Watson & Viney, Ltd., 1, Creed Lane, London, E.C. This little work will be useful to you as it has lately been supplemented with contributions by Hector Maclean.—ED.]



Stereoscopic Notes.

Stereoscopic Camera for Three-Colour Work.

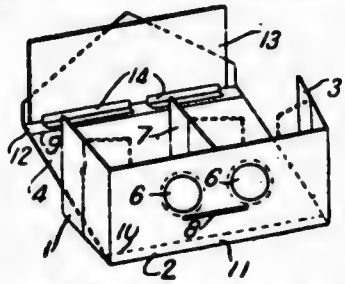
Mr. W. N. L. Davidson, of 20, Middle Street, Brighton, has patented an apparatus comprising a stereoscopic camera, which can be used for three-colour photographic work; and a special double dark slide. The red sensitive plate *f*, Fig. 1, is exposed through an orange



filter *g* on one lens *c*. In the other half of the plate carrier *e*, the two plates, *h*, *i*, are placed face to face, with a suitable filter *j* between them, at the back being yellow or green sensitive plate *h*, and in the front an ordinary or blue sensitive plate *i*. The lens *b* is stopped down to a much smaller aperture to balance the exposures. To get a complete set of pictures required for a stereoscopic photograph, the above arrangement of plates is exposed in a reversed position, and for this purpose the double dark slide, Fig. 2, is provided. The rabbets in each leaf, *k*, *m*, are deep enough to take two plates, and the red filter *l*, *n*, are placed in the relatively opposite halves of the two leaves. The camera has a sliding baseboard, so that, when stereoscopic photos are required, the axis of each lens can be brought successively in the same position relatively to the object photographed. The inventor claims that the double dark slide above described may be used in combination with Theodore Brown's Stereoscopic Transmitter, in which only one lens is required for obtaining the dissimilar pair of images at one exposure.

Stereoscopic Picture Envelopes.

The accompanying cut shows a device invented by Mr. L. Walfram, of Austria. In his complete specification he thus describes it. Picture post cards are provided with stereoscopic photographs, and are transmitted in cardboard or like envelopes or casings convertible into

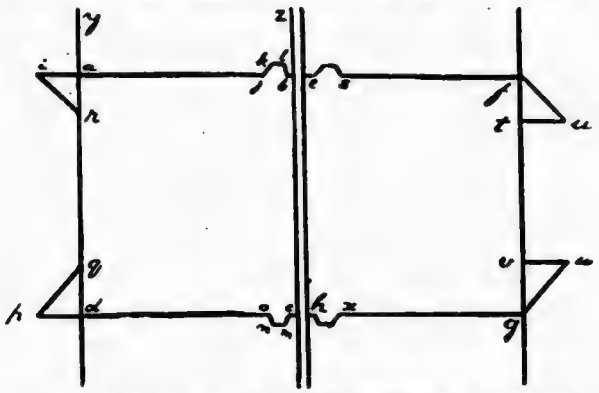


stereoscopes. The envelope, shown unfolded into stereoscope form, consists of rectangular parts 1, 2, 3, 4, and a triangular part closing into a slot 8 in the part 2. The part 4 folds along intermediate lines 9, 10, to form ends 12, 11. The parts 1, 3 form, in one case, pockets for the post cards, and in the other case walls of the stereoscope. The part 2 is fitted with lenses 6, and an intermediate

folding partition 7. The post card 13 to be viewed is supported against the triangular part, and by narrow strips 14 attached to the part 4. In appearance the envelope stereoscope, when open for use, is not unlike to the cabinet stereoscope sold by Messrs. W. Butcher & Sons, of Camera House.

Transposing Film Negatives.

Amateurs having no special appliances for making stereoscopic transparencies, will find the following plan simple and satisfactory:—Draw a diagram as hereunder, where *a*, *b*, *c*, *d*, and *e*, *f*, *g*, *h*



are of the size that the finished transparency is intended to be and *ia*, *tu*, *vu*, *dp* are not more than half an inch long. Fix the right hand half of the negative, with the film upward, above *a*, *b*, *c*, *d*, so that the portion of the picture intended to be retained will lie exactly within that rectangle, and cut the negative along the line *i*, *a*, *j*, *k*, *l*, *b*, *c*, *m*, *n*, *o*, *d*, *p*, *q*, *r*, *i*. Then place the left hand half of the negative so that the part which is to be retained may rest over *e*, *f*, *g*, *h*; fix it there, and cut it in the same way as the right hand half. Then place a piece of clear transparent celluloid over the diagram, and cut slits in it at *jb*, *es*, *ft*, *vg*, *hx*, *oc*, *dq*, and *ra*, and insert the tags on the two halves of the negatives into these slits. If the negative is very dense, it may be impossible to see some parts of the lines in the diagram through it, but in that case their position can be easily ascertained by the projecting lines *ay*, *bz*, etc. The celluloid is tough enough to be used a number of times by removing the negatives as they are printed, and substituting fresh ones.

Recreative Stereoscopes.

In a recent issue of the *Photo-Revue* (Paris), Ch. E. Benham describes a novel method of producing stereoscopic harmonographs. Briefly, the method is this: At the juncture of the two horizontal arms coming from the upright pendulum rods, a pin is pivoted, which in the ordinary way serves as the tracer of the design. On the top of this pin a silvered bead is fixed. The apparatus being set in motion, the bead is, of course, made to move in a corresponding path to that taken by the pin point resting upon the drawing surface, which may be a glass plate lying horizontally. An ordinary stereoscopic or twin lens camera is set up at a suitable distance from the oscillating head. The image of the bead is reflected from an horizontal mirror through the lenses of the camera, the operations being conducted in a dark room, and the bead suitably illuminated. Hence the only object visible to the camera is a brightly illuminated point on the bead, which is seen in the mirror. The luminous point which is received on the sensitive plate in the camera leaves its impression, as it is made to oscillate, thus tracing dissimilar harmonographic designs. As the movement of the bead is followed by the two lenses from their respective view points, their axes being directed toward the mirror, the pictures are not exactly alike; and when viewed, combined in the stereoscope, have all the appearance of exquisite wirework floating in space.

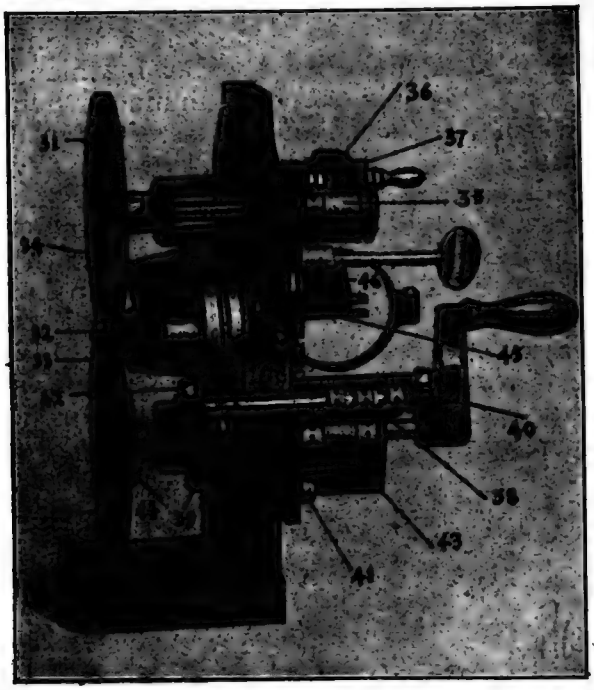
Stereoscopic Negatives for Producing Coloured Photographs.

In the *Patent Journal* for April 19th is an abridged specification, No. 28,798, as follows:—*Producing Coloured Photographs.*—Sub-divided coloured stereoscopic negatives are taken through parti-coloured screens, the patterns of which are differently arranged. In line screens, the lines of one screen are at an angle to those of the other screen. It is difficult to understand the exact nature of this invention from the scanty particulars thus given, and stereoscopists who desire further particulars may be able to obtain them from the patentee, C. L. A. Brasseur, 10, East Fifteenth Street, New York, U.S.A.

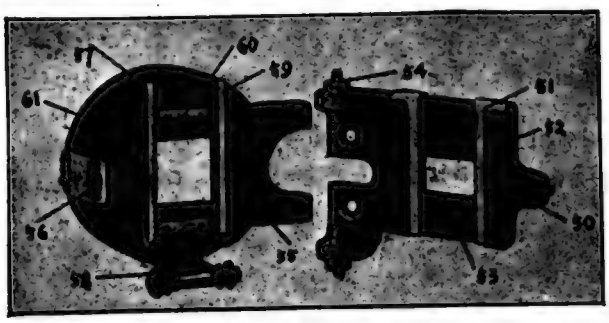
Review of Apparatus.

R. W. Paul, 68, High Holborn, London.

To the making of improvements there seems no end and Mr. Paul is indefatigable in adding details to his excellent animatograph, which cannot fail to increase its success as a projector. His last machine, which is called the "Reliance," has many new features, which may be summed up as follows:—Little strain on the film, rapid change of picture, correct optical system, strong design and accurate construction, effective safe guards from fire and accessability to all parts. In order that our readers may better understand the details of the improvements we have given herewith two illustrations which speak for themselves, and which clearly point out how old difficulties have been ingeniously overcome. Although these show the clever ingenuity of the designer, we would ask all those interested to avail themselves of an inspection of the actual mechanism and to listen to the explanation given by Mr. Paul's capable manager, Mr. Jno. W. Smith.



A rear view of the mechanism is shown, the film gate being detached for the sake of clearness. The intermittently-moving sprocket 38 is mounted on a steel spindle running in hardened steel bushes, carried by the cock piece 41, which is bolted to the frame so that the whole movement may be taken off if necessary. On the shaft bearing the sprocket is a star-wheel, of the special form invented by Mr. Paul, having three radial slots; a hardened steel roller in the heavy driving fly-wheel 33, on entering one of the slots imparts movement to the star-wheel, which (owing to the fact that the slot forms a tangent to the pitch-circle of the driving roller) is at first very gradual, increasing to a high speed as the roller reaches the dead centre, after which the speed gradually decreases leaving the sprocket at rest, the whole movement being effected in the shortest possible time without the slightest shock and with no strain on the film.



The film gate has been very carefully designed to prevent heating of the film, the heat being carried off by a casting with large radiator. The film itself is nowhere touched by any springs, which are always apt to wear out and then tear it, but runs between the flat hard steel surfaces 51 and 59, a light pressure only being maintained between them.

It will be seen from the illustrations that the usual top and bottom sprockets for feeding the film continuously have been provided, and a feature of the machine is the facility with which the film can be placed in position, or removed from one side without any threading operation.

The masking device is extremely accurate and rapid in action, and we need hardly mention the fact that flickering is now entirely abolished, since the shutter is closed for only one-sixteenth of the time that it is open. The brilliancy of the picture is also much enhanced.

The Walturdaw Co., Dean Street, Holborn,

Have several specialities on view at their new Show Rooms, one of the most striking is their Bioscope No. 2, complete for £20, which has been introduced to meet the demand for a cheap and good machine. The workmanship and finish is equal to their No. 1 Model, the only difference being that the mechanism is lighter. This firm have just put on the market a new Carrier, made of nickel brass, which entirely does away with the danger of melting or fusing joints by excessive heat. Another speciality is an improved device for raising, lowering and centring the lime-light jet in the Lantern, by means of a moving pillar. Any size of jet can be taken, so that the lanternist can keep his light centred as easily as with an arc lamp, having similar movements. The aim of the Walturdaw Co., is to supply everything of the best connected with animated Photography, and a call at their show rooms, or an application by Post, will speedily prove to Exhibitors that they are horoughly carrying out their ideas.

The Human Eye, showing the Muscles and Optic Nerve.

EYES

AND

How to Use Them.

BY

PROFESSOR GOLDING.

IN the "auld lang syne" it was once the fortune of the present writer, when passing along the towing path of a canal in Lancashire, to encounter one of the patient horses engaged in towing a heavily laden barge. The driver of this useful animal, with the peculiar refinement and courtesy which, in that far distant period, characterised his class, addressed to the writer this pertinent question, "Eh! carnt thee believe thoy own oyes?"

The enquiry was scarcely called for, being addressed to an utter stranger, and on a subject of no public interest; but in sober fact, if we do always believe our own eyes, we may discover that in many instances, and in no small degree, they may betray us, and lead us very far astray.

The truth is that we constantly need not merely to see, but to learn to understand and rightly appreciate what we see. To cry for the moon is commonly supposed to be one of the follies of untrained childhood, and it may be that in their early years many of us were very little wiser; but apart from experience, which can, in this as in other matters, only be gained gradually, and, perhaps, at the cost of much toil and many disappointments. What is there in the appearance of our satellite to indicate that it is situated far beyond our reach.

Persons, who, owing to cataract or some other natural defect, have never enjoyed the blessing of sight, have sometimes by surgical skill been enabled later in life to gain the power of vision; and such persons have usually found themselves misled on every hand by the newly acquired sense, and have been compelled to verify by touch or some other means what they saw or supposed they saw.

One such person imagined that all the objects he saw must be in actual contact with his eyes, while another finding, by handling it, that a picture in accurate perspective, and apparently solid, was in reality painted on a plane surface, enquired whether his sight or his touch was deceiving him; and we are all liable to fail in estimating the true size and distance of mountains or other remote objects seen under unfamiliar circumstances, through an unusually clear atmosphere, for example.

Even such familiar objects as the sun and moon appear smaller when high in the heavens than when near the horizon, and we can only judge of unknown objects by comparison with others whose size and true character are known to us.

The image produced by rays of light, which have been brought to a focus by passing through the optical system of the eye, is certainly projected upon the Retina in an inverted position; yet the brain, having unconsciously learned by experience what meaning to attach to certain impressions conveyed by movements of the optic nerve, receives no erroneous

impression from that which is within the range of its experience, while the distorted visions which appear to pass before the eyes of an insane or intoxicated person seem to show that the effect of sight may be produced in a diseased brain without any actual image being received upon the Retina.

We also find that by the effect known as "Irradiation," a bright object seen against a dark background always appears larger, and a dark object against a light background smaller than it really is.

Thus the black disc in Fig. 5 and the white one in Fig. 4 are of precisely the same size, yet to most eyes the former will appear smaller than the latter.

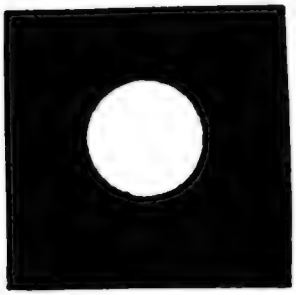


FIG. 4.

FIG. 5.

The effect known to the photographer as halation, and observed where dark and light objects meet, as round the edges of windows in some comparatively dark interior, or trees seen against a brightly lighted sky presents a very similar appearance, as though the light rays overflowed their boundaries, and trespassed on the margin of their darker surroundings.

And so to some extent they actually do. If we observe a river or stream flowing swiftly through the arches of a bridge, or meeting with some obstacle such as a projecting rock or tree-stump, we shall find the water curving round the piers of the bridge or other obstruction, and spreading out on either side after passing them; and the rays of light behave much in the same way when their course is similarly interrupted, and probably spread a little over the delicate nerve surface of the Retina, as a stream of water would do if it fell from a little height on a level pavement.

On the very rare occurrence of a transit of the planet Venus over the sun's disc—phenomenon so infrequent that no one now living can hope to witness it, since nearly a century must elapse before another opportunity can present itself—it has been found extremely difficult to determine the relative size of the planet's dark form, or to recognise its true shape when projected upon the intensely bright solar disc owing to the effects of Irradiation, for which considerable allowance has had to be made.

Further, we, in common with almost all land animals and birds, are provided with *two* eyes, by the use of which the brain can form a far truer estimate of the true form and character of objects, especially those which are solid, than would be possible if, like Polyphemus, we had only been supplied with one.

Space will not permit us to enter at any length into the phenomena of binocular and stereoscopic vision; suffice it to say that each eye sees objects from a slightly different point of view from that of its fellow, the right eye seeing a little farther round the surface of a solid object in one direction or on one side, and the left slightly farther on the other; and that this difference of angle, small as it may be, gives us the power of recognising solidity and the presence of objects at various distances better than a single eye possibly could do. It is evident that each portion of the Retina of one eye has a corresponding point in that of the other, and when the image of an object or any part of it falls upon the corresponding point in both eyes, the brain is conscious of but one impression, and a single image results. If, as the result of fatigue or disease, or by slightly pressing one eyeball the coincidence of the images be disturbed, we see objects double, and much confusion results, it being needful that the axes of the two eyes should be so directed as to meet at the point to which our attention is called, which is done unconsciously and automatically by the muscles of the eyeballs. The lanternist who wishes to produce an "effect," or combined picture by the use of two lanterns, as in the biunial form of instrument, or the observer who uses the binocular microscope, will have his lens tubes so inclined to one another that their axes meet at the desired point, or will produce a similar result by the aid

of prisms to alter the course of the rays of light; and will thus imitate by artificial means the muscular action of the eyes in making the required adjustment.

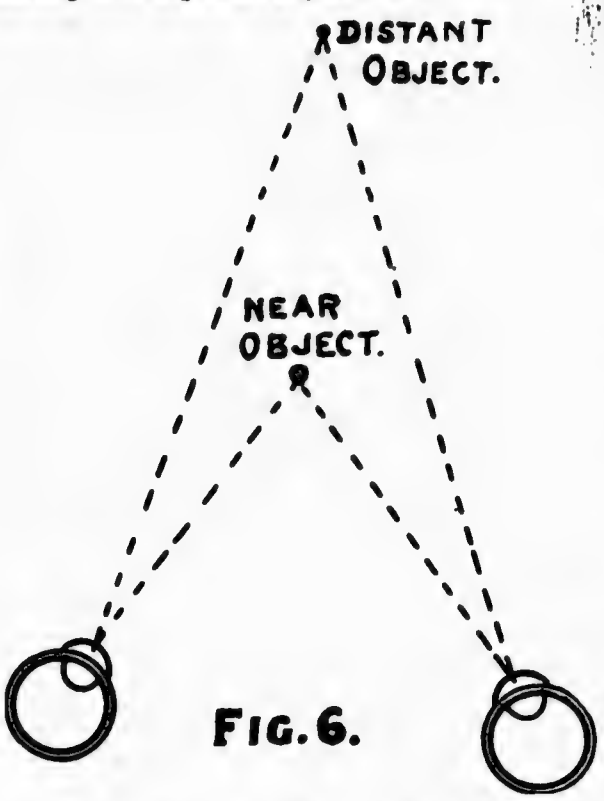


FIG. 6.

The diagram will show clearly that the angle at which the axes of the eyes must be inclined to one another will vary with the distance of the objects to be observed, this angle increasing with the approach of the objects, and being greatest when attention is directed to those which are close to the limit of distinct vision, about eight or ten inches in the case of the average eye. Objects nearer than this cannot be distinctly observed with both eyes at the same time.

A simple experiment will also show that every eye possesses a blind spot the "Punctum Caecum," situated at that point on the Retina where the nervous fibres spread over its surface unite to form the "Optic Nerve" which leads to the brain. Any object whose image falls upon this spot is not seen at all, but habit has made us unconscious of this fact, and it is only realised when our attention is specially called to it.

Besides, in ordinary vision, the same point in the image of any object observed, never falls on the blind spot in both eyes at the same time, and thus one of them is enabled to see what the other cannot, and to make up for the deficiency of its companion.

Vision with one eye usually enables us to estimate the direction of an object more accurately than its distance, as we shall probably find if we close one eye, and attempt with the aid of the remaining one to touch a spot on a wall, or to pass the finger or a curved stick through a ring placed at a little distance with its edge towards us. If unfamiliar with the experiment we may find ourselves, to our great surprize, completely deceived as to the true position of the object aimed at, and those who are addicted to the reprehensible habit of submitting every doubtful question to the test of a wager, may probably find themselves sadder as well as wiser men, as the result of an attempt to rely too confidently upon the evidence of their own eyesight.

Nor is it always possible, by the aid of only one eye to form a correct view of raised or depressed surfaces. Thus a concave body may be mistaken for one that is convex, and an incised inscription or medallion for one in relief, or *vice versa*. While the elevations or depressions on minute objects such as some diatoms, viewed by the monocular microscope, appear so much altered under different conditions of lighting, as to leave it still uncertain what their true character is. When both eyes are employed these pseudoscopic impressions usually disappear, and it would seem that the brain, being accustomed to the double image, fails to appreciate any other with accuracy and certainty.

Persistence of Vision, or the tendency of the Retina to retain for an appreciable time, the impression due to an image projected upon its surface, is responsible for many optical illusions.

Every traveller will be familiar with the manner in which objects seen from the window of a railway carriage, which is moving at a high speed, seem to blend with one another and produce a confused image or succession of images, which soon become very fatiguing and distressing to the observer. The apparent circle of light produced by whirling a lighted torch or red hot iron, before the eyes in a darkened

place, and the blending of colours on a rapidly revolving top or the spokes of a fly-wheel, furnish familiar examples of the same effect, and many ingenious yet simple contrivances, such as the "Thaumatrope," and the "Zætrope," a "Wheel of Life," have been devised at various times and depend upon the same principle. In these a succession of images each of which comes into view before the preceding one has been lost sight of, seem to form a continuous picture and to represent objects in actual motion, or severed limbs or heads united once more to the body to which they properly belong, with many other strange and sometimes grotesque combinations. TheKinematographic film,at once the latest and most complete and elaborate of all these optical devices, need only be mentioned as a crowning example of the results, which may be attained by the aid of Persistence of Vision. The Retina retains an impression made upon it for about the sixth part of a second, and if one image follows the other at a shorter interval both are present together, and thus the phenomena of sight enable us to see objects in actual motion, and to realise the succession of events so completely that the entire process appears to pass before our eyes, as though we were actually present to witness its occurence.

We judge of the size of any object by the angle which it subtends to the eye, or that which with lines, drawn from its extremities and meeting at the eye, would make with each other; and as this depends upon the distance rather than on the actual dimensions of the object, we find that an avenue of trees or a line of posts extending to a considerable distance appear to become smaller, and to approach one another as they recede, and, if no obstacle intervenes, to meet at the farthest extremity of the view; while a finger held near the eye appears large enough to compare with a tree or a lofty building at a distance, or, perhaps, even with a mountain a few miles away.

But experience has taught us that these objects are very far from being of the same size, and our knowledge of their actual dimensions corrects in large measure the estimate we should otherwise form.

Probably every amateur photographer has frequently been disappointed, when focussing his camera upon a distant landscape, to see how insignificant a space on his focussing screen is occupied by a range of hills, a grove of lofty trees, or a stately and imposing pile of buildings, which seemed to the eye to be of commanding proportions. Here experience and reason had corrected the mere visual image, and had given these prominent objects an apparent size considerably greater than would be suggested by the narrow angle they subtended. But when the lens brought the observer's conceptions to the test of actual angular measurement, he found himself confronted with another proof, if proof were needed, that his eyes had deceived him, or had at least failed to give an accurate report.

It must be noticed, merely in passing, that the magnifying power of lenses, either in the simplest form or in that of the most elaborately constructed compound microscope or telescope, depends upon bending the rays of light proceeding from the object observed, so that they enter the eye at a greater angle than they would do without such optical aid.

The telescope, especially when directed to extremely distant luminous objects, such as the stars and other heavenly bodies, renders a somewhat different but equally valuable service by collecting the light which would otherwise fall upon a comparatively large surface, and so refracting it as to cause it to form a pencil of rays narrow enough to pass through the pupil of the eye. The result is not to increase the apparent size of the object to any great extent, but very considerably to increase its brightness, rendering distinctly brilliant a distant luminary, which without such aid would be almost, if not entirely, invisible by reason of the very minute space of its light, which could enter so small an opening as the pupil of the eye, and which would be insufficient to stimulate the nervous system of the Retina to such a degree as to produce the sensation of vision.

Thus, then the Eye of Man is a most delicate and a most beautiful instrument, exquisitely sensitive, and to all appearance most fragile and liable to injury, yet in reality, strong and durable in a most remarkable degree, capable of enduring the extremes of climate, whether of the

frozen polar waste or the burning tropical desert.

While the loss of any sense is a calamity, the magnitude of which it would be difficult to over-rate, it may fairly be considered that so far as communication with our fellow creatures is concerned, the loss of hearing with its faculty of speech, may be a more serious calamity than that of sight. But, if communion with nature, and the power of reading that wonderful book, and of searching the matchless and inexhaustible storehouse of creative skill be in question, then no sense is of such inestimable value, as that of sight, and none can be less readily dispensed with.

It is indeed true that a blind naturalist like Huber, or a philosopher such as Sanderson, has been enabled to dive deeply into nature's mysteries and read the book of knowledge, yet they have been dependent, like the author of "Paradise Lost," upon friendly eyes which have in measure supplied the place of those whose use had been denied to themselves.

Not a few, having eyes, go through the world as though they had none, or as though, instead of being capable of healthy and useful motion in their orbits, they were permanently fixed in one direction, being concentrated without rest or intermission upon a deceptive and often illusory object known as the "main chance," which, "like the baseless fabric of a vision," is only too frequently found to have "melted into thin air," and like the "unsubstantial pageant" it is, to have "left not a track behind."

But the student of Nature will gain through the rational employment of the powers with which he has been endowed, ever increasing knowledge, and higher thoughts of the wisdom, power, and love which originates and sustains the whole. Every plant, however humble; every living organism, however low in the scale of life; even the very dust of the earth itself will be to him a mine of wealth, of knowledge, and of pleasure, not for himself alone, but for the benefit of his fellows. If deprived of their society and intercourse, he will yet find around him abundant evidence that for him "Stone walls do not a prison make, nor iron bars a cage."

Even in solitude he will, like Shakespeare's banished Duke, have constant occasion to say:—

"This our life, exempt from public haunts,
Finds tongues in trees, books in the running brooks,
Sermons in stones, and good in everything."

END.

REVIVAL OF THE OPTICAL LANTERN.

WE heartily endorse the views held by a writer in a recent issue of "Camera House Journal" when he says:—

"We have recently noticed in many of the annuals interested in Photography, articles commenting upon the "Revival of the Optical Lantern," and adducing reasons to account for it, all deplore that it should ever have been under a cloud, and the Cinematograph generally seems to come in for most of the blame. This appears to us rather hard on the Cinematograph, if we go back to the days before the advent of that interesting instrument, what do we find? Everyone connected with the making and using of Lanterns doing all they could to imitate life motions on the screen; we had slipping slides, rackworks, silhouettes and other terrible devices too numerous to mention, amongst them many mechanical slides that displayed remarkable ingenuity, and which still elicit unstinted praise from an audience when manipulated by a skilful operator. Living pictures were the aim, and living pictures we all wanted, and living pictures we at last have. Therefore, it is, illogical in the extreme for lantern men to sneer at or feel envious of the popularity of the Cinematograph. The fact is, that there's no more difference between a Cinematograph and a single Lantern than there is between a single Lantern and a Bi-unial; with a Bi-unial one can specially exhibit Dissolving Views which are impossible with a Single Lantern, and the difference in cost between a good Bi-unial and a Cinematograph is very little. It is the Bi-unials and other more complicated Lanterns that have been most effectually eclipsed by the Cinematograph. Taking all in all the trade have much to thank the inventors of Cinematographs for, as the turnover in instruments and films has been much greater than ever it was with Lantern and Slides only.

Optical Illusions.

No. VI.

By EDMUND H. WILKIE, *Of the late Royal Polytechnic Institution.*

We left (in last issue) the Italian noble striding towards the torture chamber in the old tower. To cut unpleasant matters short, all kinds of barbarities were exercised upon the unfortunate Count Capo di Monti, to induce him to give up his wealth, but without avail. While in the midst of these horrors, the magician I have mentioned arrived, having been previously summoned in case his aid was required. In consultation with his patron, he explained that the spirit did not leave the body immediately after decapitation, and promised that if the Count was executed in this manner, he would by magic spells compel the head to disclose any secret contained in the brain. The headsman was at once summoned, and the Count being decapitated, his head was placed on a plate —then the lecturer paused for a moment— tremolo chords issued from an invisible orchestra, and the curtain, slowly rising amidst low rumbling thunder and flashes of lightning, disclosed the scene illustrated in the May number of this Journal, Fig. XVII.

A dungeon with a recess at the back, in which stood a three-legged table supporting a human head on a dish flanked by two grinning skulls, while overhead hung a lamp which illuminated very little more than the interior of the recess. Near the front on the O. P. side stood the headsman, clad in red and black, leaning upon a large two-handed sword, and close by him the beheading block, while the opposite side was occupied by the magician with a brazier before him. There were other objects on the ground, such as a coffin, and a headless trunk lying on a heap of straw, but as my object is to inform and amuse, and not to horrify or disgust, I have to a certain extent "bowdlerised" the scene.

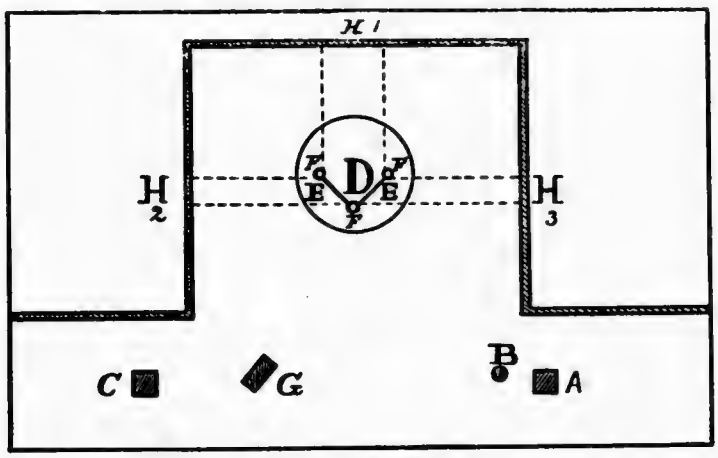


FIG. XVIII.

The thunder continued, but it is to be remarked that it was thunder of a very accommodating, not to say polite nature, as it kindly moderated its tone when the magician commenced to speak.

Raising his hand on high he cast one of his spells (red fire) into the brazier, followed by a more potent one (blue fire), all the time

reciting an incantation which (green fire) was quite incomprehensible to the (a little lycopodium) mind of the uninitiated.

At last, after the most powerful spell (a pinch of gunpowder) had been cast into the fire, the head, apparently unable to bear it any longer, slowly opened its eyes and spoke as well as the fumes would allow it, asking the wishes of the magician. These he recited at great length, demanding to know where the deceased man's riches were concealed. The head then made a speech acknowledging the power of the magician, and proceeded to explain in what these riches consisted; but just as he commenced entering into minute details as to where they were to be found, the power of the spells expired, the eyes closed, and down came the curtain.

Having seen the effect as it appeared to the visitors, let us inspect the modes of working this extremely dramatic illusion. We shall very quickly understand all about it on reference to Fig. XVIII.

(A) represents the magician, (B) the brazier, (C) the headsman, and (G) the block. In the niche at the back of the scene the round table (D) is supported by the three legs (FFF), between which to the right and left of the front leg are placed the two plain mirrors (EE). The edges of these mirrors at the top and sides are concealed by being let into grooves in the woodwork of the table, and the bottom edges are hidden from view by loosely sprinkling a little straw close against them.

The most particular point in arranging the table and mirrors is to be sure that the legs of the table stand at the same distance from the sides as they do from the back, otherwise the reflections will not register. For instance, in placing the table when fitting up, the width from side to side should be first measured, and if this is, say 12 ft., at 6 ft. from the back, a line should be drawn right across from one side to the other, and another from the centre of the back towards the front, and where these two lines intersect, the spot must be marked on which to place the front leg of the table. When this point is fixed, other lines drawn from it to the corners will give the angle for the back legs; the mirrors will then be found to be at the angle of forty-five degrees with regard to both walls.

In the space hidden by the combination of mirrors the actor kneels upon the stage, and thrusting his head through a hole in the table top, a dish in sections is arranged round his neck. His face is painted to appear as ghastly as art can make it, and just before the rise of the curtain he inclines his head a little to one side and closes his eyes.

It is almost unnecessary to remark that the painting of the scene should be exactly the same at the back and sides, so that no difference may be perceptible between the reflection and the reality.

When the spectator views this illusion from the front he supposes that he can see under the table, between the legs, to the back wall,

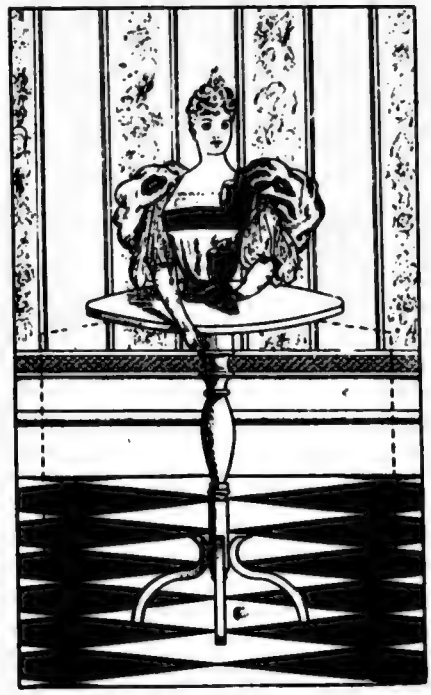


FIG. XIX.

but on reference to the diagram it will be apparent that he does not see the portion of the background (H1), but in its place looks upon the reflections of (H2) and (H3), which, when combined, occupy the same space as would be shielded from view by the mirrors. The lamp which illuminates this recess is also carefully placed to evenly illuminate the whole.

The principle of this illusion has been utilised in many ways, and is the foundation of many of the illusions taken round the country by travelling showmen, as, owing to the small size of the mirrors, it can be prepared at very little expense, and is very portable. The most puzzling adaptation of this principle is undoubtedly that illustrated in Fig. XIX., where the upper half of a woman's body is represented as being supported on a table with one leg. We can understand the three-legged arrangement, but this little chess table has a very remarkable appearance, as it would appear at first sight that there is no possibility of concealing any apparatus in this case. But it is in reality very simple, as we shall now see. The two mirrors are placed in the same relative positions to each other, and to the walls as in the last illusion, both having an edge let into the centre leg, and extending outwards as shown in the dotted lines in the illustration.

It was found by experiment that if the glass plates were of very fine quality and cleanly cut at the edges, that when viewed from a short distance in front, the edges were prac-

tically invisible, but when the spectator moved to the right or left of the centre they became apparent, and also the stage lights became reflected, showing a thin silvery line. In the first place a little lampblack was painted upon this line, but not being successful, it was determined to render the plates as thin as possible at the edges by bevelling, and by this means the plates were not to be distinguished from the surroundings when exhibited in a hall of any considerable size.

The most perfect illusion of this character (with the exception of the decapitated head) was witnessed by the author twenty-six years ago in a shop in Tottenham Court Road, which, being to let, was hired in the interim by a travelling illusionist, who exhibited half a young lady called "Fatima."

On entering the "Hall of Mystery," we found it divided into two parts by a barrier extending from side to side, the portion nearest the street being set aside for visitors, while the rear portion contained the illusion.

This illusion, which is set forth in Fig. XX., differed in one material point from the foregoing, inasmuch as the table had four legs. One leg was placed in the centre of the front, two others were at the sides, and one at the back immediately behind the front one. Now the three-legged arrangement has been explained, but where does the fourth one come from? This needs considerable thought to solve the mystery. It will be observed that at level distances on each side of the table stand pedestals supporting lamps ostensibly for the purpose of illuminating the lady's face, and showing that "there is really no deception."

Although the drawing is not to scale, I have taken great pains to keep the correct angles, and if one of the side legs of the table is taken as a centre, it will be found that the lines in the pattern of the flooring upon the junction of which the back leg stands, extends forwards right and left, passing the side legs, and also running behind the pedestals. If the squares are counted, it will be noticed that from the centre of the pedestals to the mirrors between the legs the distance is

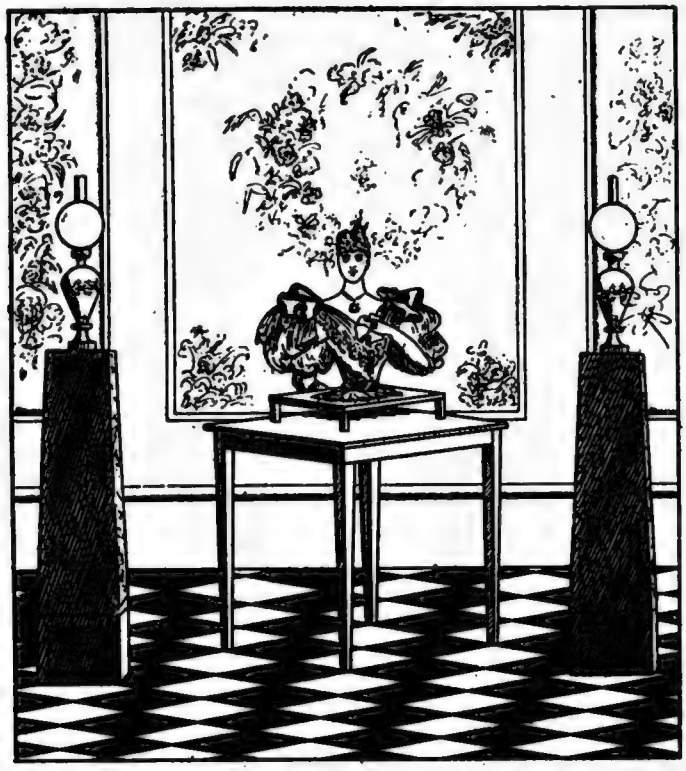


FIG. XX.

exactly two squares, therefore, any object placed behind the pedestals would appear reflected just two squares further along the line towards the back; in fact, just where the back leg of the table is placed in the illustration.

Bearing this in mind, it will be readily understood that it is only necessary to place a dummy leg in position behind each pedestal to realise this effect. It is necessary to have a dummy on each side, as the spectators standing to the left of the centre would see the reflection of that on the left, and those on the right of the centre, that on the right.

(To be continued).

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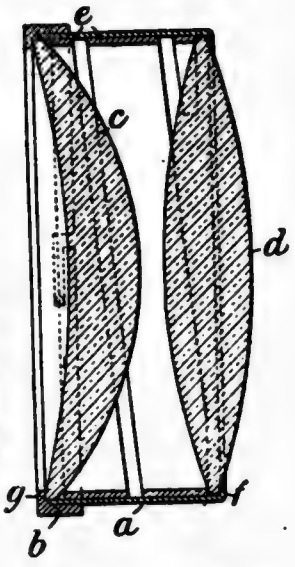
PATENTS.

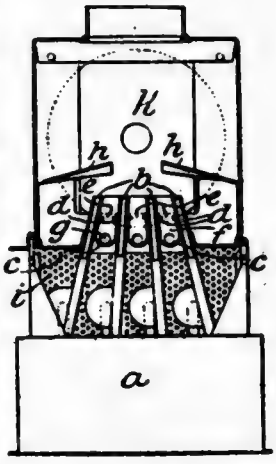
No. 382. Magic Lantern Apparatus. WRENCH, A., 50, Gray's Inn Road, London. January 6.



To avoid undue stresses, due to expansion or contraction, and to allow lenses of different thicknesses to be used, a condenser for an optical lantern has a spring distance-piece *e* arranged between its lenses *c*, *d* which are pressed against flanges *g*, *f* on the cap *b* and the tube *a*.

No. 705. Oil Lamps for Optical Lanterns. WRENCH, A., 50, Gray's Inn Road, London. January 11.

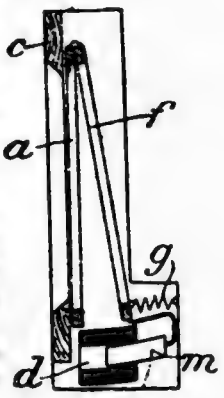
FIG. 3.



In a lamp for optical lanterns, etc., and of the type described in Specification No. 9934, A.D., 1890, the channel-shaped strips *c* of perforated metal, which are placed between consecutive wick-tubes *b* to retain charred cotton from the wicks and to distribute the air supply, are fixed some distance below the top of the wick-tubes. The upper edges *d* of the strips are bent inwards to provide a central passage *e* for the ascending air. The ends of the strips are covered by plates *f*, in which are formed holes or perforations *g* to facilitate the removal of material collected in the strips, and to admit an additional air supply. Baffles *h*, with square corners, are placed in the chamber h^1 above the burners to direct and concentrate the air over the wicks. A perforated screen *i* is fitted in the plane of the back of the chamber h^1 to divide the current of air entering at the back of the lantern; the screen is held in guides which permit of its removal when the chamber is turned back, and thereby facilitate the cleaning of the top of the reservoir *a*.

No. 1090. Illusions, producing. FELDMANN, O., 90, Leman Street, London, E.—(*Faber, W., Berlin.*) January 15.

FIG. 2.



Relates to means for altering the effects of pictures or for producing apparent movements, such as reddening of faces, lifting of eyebrows, etc. For this purpose two or more pictures are brought into position mechanically, one after the other, so as to combine with a main picture, the whole being illuminated from the front. All the pictures are required to be transparent except the one at the back. In one arrangement a transparent surface *a*, Fig. 2, such as glass, is mounted behind an opening in a case *c*, and carries the main picture. The secondary picture is mounted in a frame *f*, which is hinged at the top and held back at the bottom, as shown, by a spring *g*, and is moved, when required, by an electromagnet *d*, *m* up to the main picture, the effect of which is thereby altered. In another arrangement the secondary picture is carried by a sheet of paper, cloth, or other material, which is secured at the top, and bulged by means of a spring to keep it out of contact with the main picture; a vertical electromagnet is used to manipulate the secondary picture. In a modification, the frame *f*, Fig. 2, is hinged or otherwise supported at the bottom, and is operated pneumatically by bellows, which are inflated by a ball. Any number of auxiliary pictures may be used, and may be worked by a clock or electric motor.

No. 1,211. Kinematographs. SCHILLER, C. C., 14, Forest Road East, and ROSEBLADE, S. J., St. Albans Chambers, 17A, Long Row, both in Nottingham. January 18.

A kinematograph is constructed so that the film shall not catch fire in case of its breaking, the breaking of the film being made to close an electrical circuit, which extinguishes the projecting-light, or automatically releases a fireproof shutter in front of the film, or does both these actions simultaneously. The film is moved by two sprocket-wheels, the feeding-wheel P^1, Fig. 7, being turned by a handle F^6, and the other being driven by a suitable gearing. Before the film passes to the position from which it is projected, it is bent into a loop which is concentric with two metal strips F, E^1, Fig. 2, mounted on insulating-blocks G, F^2, secured by bolts, which pass

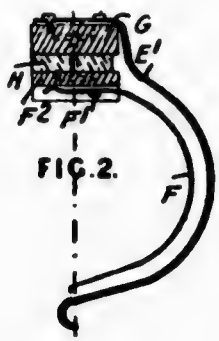


FIG. 2.

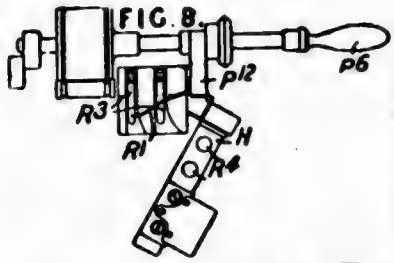


FIG. 8.

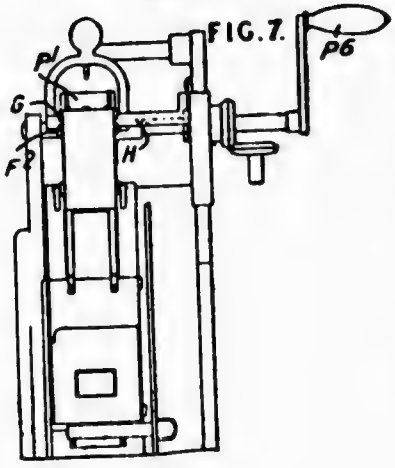


FIG. 7.

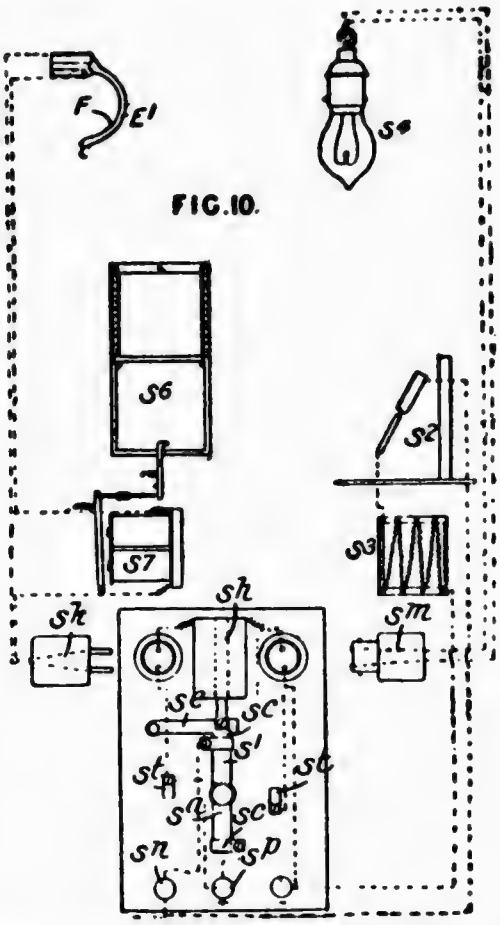


FIG. 10.

through insulating-bushes, and nuts, to a metal bracket H hinged to an upright P^{12}, Fig. 8, so that the bracket may be swung back when a film is changed. The metal strips F, E^1, Fig. 2, are insulated on the concave and convex side respectively. When a film breaks, the part of it which is being fed forwards is not carried away, and the consequent rucking of the film forces the strips F, E^1 together, the strip F working on a pivot F^1. This contact of the strips F, E^1 completes the circuit to an electro-magnet S^7, shown, with the other electrical connections, in a diagrammatic sketch, Fig. 10. A switch S^1 is so arranged that when in the "on" position, Fig. 10, a current flows to a projecting-lamp S^2, in the circuit of which is a resistance S^3, from the positive terminal S^p through a pivoted arm S^a, provided with jaws S^c, electrically connected to the terminals S^n, S^p,, when the arm is in the position shown. The arm S*a* is acted on by a spring, which tends to move the arm so as to break contact with the terminal S*n* S*p*, and the arm is normally engaged by a gravity catch S*e* which is loosely connected to the co.e of a solenoid S*h*, in series with the circuit containing the electro-magnet S7, and strips F, E1, and a circuit containing an incandescent lamp S*d*, adapted to illuminate the kinematograph during repair. These two circuits are connected to the switch by plugs S*k*, and S*m*. The electromagnet S7, when energized by contact of the strips F, E1, releases the catch of a spring fireproof shutter S6, which rises and protects the film. At the same time the solenoid S*h* is energized, and its core acts on the catch S*e* so as to release the arm S*a*, which moves into contact with springs S*f*, thereby cutting out the projecting-light circuit and short-circuiting the circuit containing the strips F, E1, so that no sparkling occurs between the strips. The lamp S*d* is illuminated as soon as the strips F, E1 touch. The circuit to the strips F, E1 is closed when the bracket H is moved back so as to change a film, and this prevents the projecting-light from being inadvertently cut off should the strips be pressed together. The bracket H is retained in its closed position by a lever catch against the action of a spring R1, Fig. 8. In the closed position of the bracket, the circuit to the strips is completed through contacts R4 and springs R3, mounted upon an insulated block on the post P12. As soon as the bracket is opened to change the film, the circuit to the strips is broken. When the film is driven by an electric motor, the current to the motor may be cut off simultaneously with the extinction of the projecting-light. The fireproof shutter may be used with an ordinary battery.

ACTIVITY is the order of the day, and firms engaged in the cinematograph business are making hay while the sun shines. Only during this week, the writer of these notes took a day off and went down to Epsom to see the contest for the blue riband of the turf, and to see how "our trade" catered for the event. He was astonished at the number of familiar faces, for nearly all the leading firms were each represented by three or four camera men. The results appear to have been eminently satisfactory, and, as has been an established custom for some time, reproductions from the negatives were exhibited the same night at most of the principal halls in London. Favoured by the sunshine, these were extraordinarily good, and gave those who had to view their Derby near home a splendid idea of what transpired on the course.

MESSRS. PATHÉ FRÈRES have issued their monthly list of films which contains a number of good subjects, amongst which we note a weird subject entitled "A Moonlight Dream." There is a strong dash of "Goosey, goosey, gander" about this film, which makes one think the days of witchcraft have not altogether departed. Another series entitled "The Mine" is also good, being a study of life in a colliery. Although not able to take the actual incidents which might happen in a mine, these gentlemen have done their next best by staging the subject so as to give the effects as near as possible to what really takes place.

MR. R. W. PAUL is offering an extremely good animated picture of Victor Trumper, the celebrated batsman in the Australian team, practising on his native heath. Taking into account that this gentleman had the misfortune to injure himself so as to be unable to continue playing in the recent Test Match, we think this particular film will meet with a good reception from the public, who will be pleased to express their sympathy with the celebrated wielder of the willow. Amongst others, we recommend in the way of short comics "The Victim of Misfortune" and "A Kitchen Argument," these two being of the high order of knock-about films; also a study of elephants at Rangoon.

MESSRS. GAUMONT & CO., whose advertisements many of us read with interest seem to justify their adopting the sketch of a fountain, as they never seem at a loss for new subjects, which flow so readily from their fountain in Cecil Court. One of their best is entitled "A Motor-Bike Adventure," whilst for a good hearty humorous subject we can strongly recommend "Their Saturday's Wages." They have also placed a long series of pictures on the market covering a number of the most beautiful scenes in Switzerland, taken during the winter, and for those people who are looking for the instructive and picturesque rather than the comic, this series will be warmly welcomed.

THE WARWICK TRADING CO., LTD., have brought out an extremely good subject entitled "How Jones saw the Derby." The trickwork is extremely well done. This is a side-splitting comic, showing the operations of a man who starts off from his home in the morning to go to Epsom. Unfortunately, he meets too many friends, and makes too many calls on his way down to the course. His view of the Mansion House crossing, where 'buses and cabs are seen going right through each other with apparently no ill effects, is most astonishing, whilst at Epsom he sees all the horses running backwards, and finishing in a dead straight line. His reception of a £5 special invincible wire from a tipster, the horse of which finishes last in the race, does not tend to improve his condition, and his return to the bosom of his family is most circuitous and also

ludicrous. This film is a decided novelty, and nothing like it has ever been attempted before. They have also brought out another film entitled "The Motor Highwayman," which is a very happy idea; it has all the violence and excitement of the old days of Dick Turpin, dressed up in the modern form of a motor bicycle instead of the celebrated Black Bess, and a Panhard instead of the old stage coach. This should have an extremely good sale, as the idea is good and the film excellent.

THE WALTURDAW CO. have many very interesting subjects in preparation; one which we think will be very successful is of great dramatic interest, dealing with one of Dickens's most interesting phases of criminal life. Among their humorous films, we would specially draw attention to "The Adventures of a Tailor's Dummy" and Walter Graham's "Living Marionettes." These are really amusing, and should prove very attractive.

REDUCING AND INTENSIFYING LANTERN SLIDES.

To rightly ascertain the exact depth to which the development of a lantern slide should be carried is always a matter of difficulty, especially in the somewhat dim light of the dark-room lamp. Less anxiety, however, need be felt if the processes of reduction and intensification be mastered. Indeed, many experienced lantern slide makers affirm it their comstant practice to reduce or intensify their slides, as the brilliancy of the image is thereby increased. Whether this is so or not, a knowledge of the processes is useful.

To reduce a lantern slide requires a medium strength solution of hypo, in which a few grains of potassium ferricyanide has been dissolved. A good plan is to keep one large crystal of the potassium salt in a bottle, shake it up well before use, and then add a little of the powdery crystals that get broken off by the sides of the bottle. The reduction should not be attempted until a full half-hour's washing subsequent to ordinary fixation, but it may be delayed indefinitely after drying, so that a trial can be made of the density required, by an exposure in the lantern. It is necessary to immediately plunge the plate into water after the right amount of reduction has taken place, as the process is rapid, and may easily be carried too far if there be any delay.

In the same manner intensification may be carried on immediately after washing, or at any future time, the only essential being absolute freedom from hypo. If, however, the film has been allowed to dry, it should be soaked for a moment in water, as uneven intensification is likely to occur if the mercury is poured on to a dry surface. Two solutions are required for intensification: (1) A 1—10 solution of mercury perchloride (corrosive sublimate); (2) a dilute solution of liquid ammonia. The lantern slide is kept in the first for 1—5 minutes, according to the degree of intensification required, washed for five minutes, and then placed in another dish, and the ammonia poured quickly over it. When uniformly darkened it is given a final washing. The greatest care must be taken to keep the two stages entirely separate, keeping the bottles apart from each other, using different dishes, and washing the hands well before touching the plate. The plate being imperfectly washed, and so freed from all traces of hypo before the mercury bath, and mercuey getting into the ammonia bath, or on to the film after it has been in it, are the chief causes of failure.

It may be mentioned thaa intensification considerably modifies the tone of a slide, whereas reduction makes practically no difference. —JEFF.—*Amateur Photographer.*

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